

Case Management: a data set of definitions

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Abstract

Knowledge-intensive processes (KiPs) are becoming increasingly important for organizations with the rise of the knowledge society. Due to their unpredictable and emergent characteristic workflow management solutions are not suitable to support KiPs. Various case management related approaches have been proposed by researchers and practitioners to support characteristics of KiPs. In this paper we provide a comprehensive list of definitions available on case management, e.g. case handling, adaptive case management, dynamic case management, production case management. For every definition we present the explicit definition, paragraphs that better describe and summarize the case management approach, or extracted sequences that define the term in the referenced publication. All of these definitions are compared against characteristics of KiPs in order to get about understanding of the domain.

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Introduction

We used Google Scholar, IEEEExplore, ACM Digital Library, Google Search, and the library of our research institutions using the terms "case management" and "knowledge-intensive process" and trying to identify the first papers that provided definition. Papers in the legal or health care fields were excluded. Three types of definitions were extracted,

Explicit definitions. If the paper had an explicit definition that was used.

Paragraphs. Papers without formal definitions, the paragraph that better described and summarized case management was used as the definition.

Extracted sentences. Papers without a paragraph that could be used as definition, sentences that defined the term were extracted.

The resulting definitions are presented in the next section. For each definition, we break it down in what seems to be the main sentences or ideas, and in a set of concepts or components. We also compared the definition with the C1 to C8 KiP characteristics identified by Ciccio *et al.* [6].

Definitions

1994	Case Management Role		Davenport and Nohria [4]
The case manager role represents a break with the conventional approach to the division of work. Individuals or small teams perform a series of tasks from beginning to end, often with the help of information systems that reach through the organization. Case managers provide a way to increase organizational efficiency, timeliness, and customer satisfaction.			
Breakdown: <ul style="list-style-type: none">• break with the conventional approach to the division of work• Individuals or small teams perform a series of tasks from beginning to end• a way to increase organizational efficiency, timeliness, and customer satisfaction			components: <ul style="list-style-type: none">• individuals• information systems• small teams• tasks• work
C1	○	Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2	○	Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3		Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
C4		Emergent	The actual course of actions gradually emerges during process execution and is determined step by step, when more information is available.
C5		Goal-oriented	The process evolves through a series of intermediate goals or milestones to be achieved.
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C7		Constraint-and rule-driven	Process participants may be influenced by or may have to comply with constraints and rules that drive actions performance and decision making.
C8		Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

2005	Case Handling	van der Aalst <i>et al.</i> [1]				
<p>Case handling is a new paradigm for supporting flexible and knowledge intensive business processes. It is strongly based on data as the typical product of these processes. Unlike workflow management, which uses predefined process control structures to determine what should be done during a workflow process, case handling focuses on what can be done to achieve a business goal. In case handling, the knowledge worker in charge of a particular case actively decides on how the goal of that case is reached, and the role of a case handling system is assisting rather than guiding her in doing so.</p> <p>...</p> <p>The central concept for case handling is the case and not the activities or the routing. The case is the product which is manufactured, and at any time workers should be aware of this context. Examples of cases are the evaluation of a job application, the verdict on a traffic violation, the outcome of a tax assessment, and the ruling for an insurance claim.</p> <p>To handle a case, activities need to be executed. Activities are logical units of work. Many workflow management systems impose the so-called ACID properties on activities. This means that an activity is considered to be atomic and either carried out completely or not at all. Case handling uses a less rigid notion. Activities are simply chunks of work which are recognized by workers, e.g., like filling out an electronic form. As a rule-of-thumb, activities are separated by points where a transfer of work from one worker to another is likely or possible. Please note that activities separated by points of work transfer can be non-atomic, e.g., the activity book business trip may include tasks such as book flight, book hotel, etc. Clearly activities are related and cases follow typical patterns. A process is the recipe for handling cases of a given type. In many workflow management systems, the specification of a process fixes the routing of cases along activities, and workers have hardly any insight in the whole. As a result exceptions are difficult to handle because they require unparalleled deviations from the standard recipe.</p>						
<table><tr><td>Breakdown:</td><td>components:</td></tr><tr><td><ul style="list-style-type: none">• a new paradigm• support flexible and knowledge intensive business processes• based on data• data is the typical product of these processes• focus on a business goal• knowledge worker decides on how the goal is reached• role of a case handling system is assisting rather than guiding her• central concept is the case and not the activities or the routing• case is the product which is manufactured• workers should be aware of this context• Activities are logical units of work• Case handling uses a less rigid notion of activities• Activities are simply chunks of work which are recognized by workers• activities are separated by points where a transfer of work from one worker to another is likely or possible• activities separated by points of work transfer can be non-atomic• activities are related and cases follow typical patterns• A process is the recipe for handling cases of a given type• exceptions are easy to handle</td><td><ul style="list-style-type: none">• activities• assisting• based on data• business goal• case• case handling• chunks of work• exceptions• flexible• goal• knowledge intensive• knowledge worker• logical units of work• manufactured• non-atomic• recipe• routing• transfer of work• workers</td></tr></table>			Breakdown:	components:	<ul style="list-style-type: none">• a new paradigm• support flexible and knowledge intensive business processes• based on data• data is the typical product of these processes• focus on a business goal• knowledge worker decides on how the goal is reached• role of a case handling system is assisting rather than guiding her• central concept is the case and not the activities or the routing• case is the product which is manufactured• workers should be aware of this context• Activities are logical units of work• Case handling uses a less rigid notion of activities• Activities are simply chunks of work which are recognized by workers• activities are separated by points where a transfer of work from one worker to another is likely or possible• activities separated by points of work transfer can be non-atomic• activities are related and cases follow typical patterns• A process is the recipe for handling cases of a given type• exceptions are easy to handle	<ul style="list-style-type: none">• activities• assisting• based on data• business goal• case• case handling• chunks of work• exceptions• flexible• goal• knowledge intensive• knowledge worker• logical units of work• manufactured• non-atomic• recipe• routing• transfer of work• workers
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2006	Case Management	Kaan et al. [7]		
No formal definition. Described in terms of the technology: What actually happens within the execution of a task for a particular case is of no concern to the WfMS. Aside from monitoring changes to case attribute values that may be of influence on further routing, the tasks in the workflow process are black boxes as far as the WfMS is concerned. ... case management is not advocated as a substitute for workflow management but as a harmonious extension. ... we propose the use of Workflow Management (including its methods, techniques and tools) on the flow of control level and introduce the case management paradigm on the work contents level. Within such a scope, it can be assumed that workers will receive work items from a WfMS, which are instantiations of particular tasks for particular cases. ... To complete a work item, a set of activities needs to be performed. A central element in case management is that the characteristics of the case determine what activities are considered to be relevant during case processing. This relevance is considered as the context of activities and expressed in terms of conditions on the case attributes. ... case management concept presupposes a very fine-grained view on the activities that people perform within the context of carrying out a work item. ... case management concept as we describe it in this paper, the AM supports the use of time frames in which activities are relevant, the starting of activities in parallel, the definition of a repository of plug-ins to be started by the user and an ad-hoc taskbar for starting common functionality from anywhere in the process. ... Case management in particular introduced the benefit of increased flexibility and uniformity in user interface presentation ... case management, ... address[es]... the issues of flexibility and awareness. ... Case management (CM) takes out the coordination logic within single tasks from the generic application. Instead, a generic system is available that offers both support and flexibility to the performer for executing a work item				
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C8	—	Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another	

2008	Case Management Work		Kerremans [8]
Case management work is collaborative and nondeterministic, meaning it has one or more points where different continuations are possible, and it departs from traditional structured, sequential predefined processes. Case management work depends more on human decision making and content than other processes do.			
Breakdown: <ul style="list-style-type: none">• collaborative and nondeterministic (it has one or more points where different continuations are possible)• departs from traditional structured, sequential predefined processes• depends more on human decision making and content than other processes do			components: <ul style="list-style-type: none">• content• human decision• process• work
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2009	Dynamic Case Management		Clair <i>et al.</i> [3]
Dynamic Case Management: A highly structured, but also collaborative, dynamic, and information-intensive process that is driven by outside events and requires incremental and progressive responses from the business domain handling the case. Examples of case folders include a patient record, a lawsuit, an insurance claim, or a contract, and the case folder would include all the documents, data, collaboration artifacts, policies, rules, analytics, and other information needed to process and manage the case.			
Breakdown: <ul style="list-style-type: none">● highly structured, but also collaborative, dynamic, and information-intensive process● driven by outside events● requires incremental and progressive responses from the business domain handling the case● case folder would include all the documents, data, collaboration artifacts, policies, rules, analytics, and other information needed to process and manage the case			components: <ul style="list-style-type: none">● analytics● artifacts● case● case folder● data● documents● events● information● policies● process● rules
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2009	Case Management	White [16]
<p>Case Management is the management of long-lived collaborative processes that coordinate knowledge, content, correspondence and resources to progress a case to achieve a particular goal; where the path of execution cannot be predetermined in advance of execution; where human judgment is required to determine how the end goal can be achieved; and where the state of a case can be altered by external out-of-band events.</p>		
<p>Breakdown:</p> <ul style="list-style-type: none"> • management of long-lived collaborative processes • coordinate knowledge, content, correspondence and resources to progress a case to achieve a particular goal • the path of execution cannot be predetermined in advance • where human judgment is required to determine how the end goal can be achieved • where the state of a case can be altered by external out-of-band events 		<p>components:</p> <ul style="list-style-type: none"> • case • collaborative processes • content • correspondence • events • goal • human judgment • knowledge • resources • state of a case
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2010 Mastering the Unpredictable [12]

The following five definitions were extracted from Swenson [12]

2010	Case Management	McCauley [9]
<p>Case management is the management of long-lived collaborative processes that require coordination of knowledge, content, correspondence, and resources to achieve an objective or goal. The path of execution cannot be predefined. Human judgment is required in determining how to proceed, and the state of a case can be affected by external events.</p>		
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2010	Case Management	de Man <i>et al.</i> [5]	
Case management is a method or practice of coordinating work by organizing all of the relevant information into one place. A case is a specific situation to take care of. The representation of the case in the case management system is thought of as holding all of the information and processes, and it coordinates communications necessary to accomplish the goal for that particular situation. The case becomes the focal point for assessing the situation, initiating activities and processes, as well as keeping a history record of what has transpired.			
Breakdown: <ul style="list-style-type: none">● method or practice of coordinating work● organizing all of the relevant information into one place● A case is a specific situation to take care of● holding all of the information and processes● coordinates communications necessary to accomplish the goal for that particular situation● becomes the focal point for assessing the situation, initiating activities and processes● keeping a history record of what has transpired		components: <ul style="list-style-type: none">● activities● case● case management system● communications● goal● history● information● one place (focal place)● particular situation● processes● specific situation● work	
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2010	Case Management	Glossary [12, 15]
Case management: A method or practice of coordinating work by organizing all of the relevant information into one place called a case. The case becomes the focal point for assessing the situation, initiating activities and processes, as well as keeping a history record of what has transpired.		
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2010	Adaptive Case Management	Swenson [13]	
Adaptive case management: A productive system that deploys not only the organization and process structure, but it becomes the systems of record for the business data entities and content involved. All processes are completely transparent, as per access authorization, and fully auditable. It enables nontechnical business users in virtual organizations to seamlessly create/consolidate structured and unstructured processes from basic predefined business entities, content, social interactions, and business rules. It moves the process knowledge gathering from the template analysis/modeling/simulation phase into the process execution phase in the lifecycle. It collects actionable knowledge without an intermediate analysis phase based on process patterns created by business users. ACM differs from business process management (BPM) in that the case information is the focus and the thing around which the other artifacts are organized. And it is the case information that persists for the long term.			
Breakdown: <ul style="list-style-type: none">• A productive system that deploys the organization and process structure• becomes the systems of record for the business data entities and content involved• processes are completely transparent, as per access authorization, and fully auditable• enables nontechnical business users in virtual organizations to seamlessly create/consolidate structured and unstructured processes• basic predefined business entities, content, social interactions, and business rules• moves the process knowledge gathering from the template analysis/modeling/simulation phase into the process execution phase in the lifecycle• collects actionable knowledge without an intermediate analysis phase based on process patterns created by business users• differs from business process management (BPM) in that the case information is the focus and the thing around which the other artifacts are organized• case information persists for the long term		components: <ul style="list-style-type: none">• access authorization• actionable knowledge• artifacts• auditable• business data• business entities• business rules• business users• case information• content• lifecycle• organization• process execution• process knowledge• process patterns• process structure• processes• productive system• social interactions• structured processes• systems of record• template analysis• template modeling• template simulation• transparent• unstructured processes• virtual organizations	
C1		Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2	○	Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3		Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
C4		Emergent	The actual course of actions gradually emerges during process execution and is determined step by step, when more information is available.
C5		Goal-oriented	The process evolves through a series of intermediate goals or milestones to be achieved.
C6		Event-driven	Process progression is affected by the occurrence of different kinds of events that influence knowledge workers decision making.
C7		Constraint & rule-driven	Process participants may be influenced by or may have to comply with constraints and rules that drive actions performance and decision making.
C8		Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

2010	Adaptive Case Management		Palmer [11]
Adaptive case management: Systems that are able to support decision making and data capture while providing the freedom for knowledge workers to apply their own understanding and subject matter expertise to respond to unique or changing circumstances within the business environment.			
Breakdown: <ul style="list-style-type: none">• able to support decision making• able to support data capture• provide the freedom for knowledge workers to apply their own understanding and subject matter expertise to respond to unique or changing circumstances within the business environment			components: <ul style="list-style-type: none">• business environment• data capture• decision making• knowledge workers• subject matter expertise• systems• understanding
C1	○	Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2		Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3		Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
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C8		Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

2011	Emerging Case Management		Böhringer [2]
Case Management is an approach to handling ad-hoc processes. It supports process instances (cases) in providing a collaborative space to store and negotiate case-related activities and artifacts (e.g. information, decisions, workflows) without the need for the ex ante modeling of the whole process.			
Breakdown: <ul style="list-style-type: none">● approach to handling ad-hoc processes● providing a collaborative space● store and negotiate case-related activities and artifacts● no need for modeling of the whole process			components: <ul style="list-style-type: none">● activities● ad-hoc process● artifacts● case● collaborative space● decisions● information● process instances● workflows
C1	○	Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2	●	Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3	○	Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
C4		Emergent	The actual course of actions gradually emerges during process execution and is determined step by step, when more information is available.
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C7		Constraint & rule-driven	Process participants may be influenced by or may have to comply with constraints and rules that drive actions performance and decision making.
C8		Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

2013	Production Case Management	Swenson [14] and Motahari-Nezhad and Swenson [10, 15]
<p>Production Case Management (PCM) is an approach to supporting knowledge workers which is programmed by specially-trained technical people (programmers) to produce a case management application. That application is deployed for use by knowledge workers to get their work done. The application offers collections of operations that the knowledge worker can select to use or not use depending on the specific needs of the case. A PCM application is used when there is a certain amount of unpredictability in the work, and some flexibility is needed, but necessary actions are regular enough or the volume of work large enough to make identifying and codifying regular patterns valuable. A worker using PCM will be involved in selecting the actions toward the outcome of a particular case, but will not be responsible for the kinds of actions that might be available.</p>		
<p>Breakdown:</p> <ul style="list-style-type: none"> • approach to support knowledge workers • programmed by specially-trained technical people (programmers) to produce a case management application. • The application is deployed for use by knowledge workers to get their work done. • The application offers collections of operations that the knowledge worker can select to use or not use depending on the specific needs of the case. • used when there is a certain amount of unpredictability in the work, and some flexibility is needed • necessary actions are regular enough or the volume of work large enough to make identifying and codifying regular patterns valuable. • a worker will be involved in selecting the actions toward the outcome of a particular case, • a worker will not be responsible for the kinds of actions that might be available. 		<p>components:</p> <ul style="list-style-type: none"> • actions • application • case • case management application • collections of operations • flexibility • knowledge workers • outcome • regular patterns • specially-trained technical people (programmers) • volume of work • work
C1	• Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2	Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3	• Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
C4	◦ Emergent	The actual course of actions gradually emerges during process execution and is determined step by step, when more information is available.
C5	◦ Goal-oriented	The process evolves through a series of intermediate goals or milestones to be achieved.
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C7	Constraint & rule-driven	Process participants may be influenced by or may have to comply with constraints and rules that drive actions performance and decision making.
C8	Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

2013	Adaptive Case Management	Swenson [14] and Motahari-Nezhad and Swenson [10, 15]
<p>Adaptive Case Management (ACM) is an approach to support knowledge workers who need the most flexibility to handle their cases. ACM allows the knowledge workers themselves to create and modify all aspects of a case at any time. There is no distinction between design time and run time: the designing and running are done at the same time by the same people. This approach is used by knowledge workers who have unique expertise in an area. They don't have a lot of time to transfer this specific knowledge to a programmer, and it is too expensive to hire a programmer for one-off cases. ACM offers a Do-It-Yourself (DIY) approach to process programming. The worker using ACM is responsible not only for the outcome of a case, but also for how the handling of that kind of case improves over time.</p>		
<p>Breakdown:</p> <ul style="list-style-type: none"> • approach to support knowledge workers who need the most flexibility to handle their cases • allows the knowledge workers themselves to create and modify all aspects of a case at any time. • no distinction between design time and run time • the designing and running are done at the same time by the same people • used by knowledge workers who have unique expertise in an area • knowledge workers don't have a lot of time to transfer this specific knowledge to a programmer • it is too expensive to hire a programmer for one-off cases • offers a Do-It-Yourself (DIY) approach to process programming • The worker using ACM is responsible not only for the outcome of a case, but also for how the handling of that kind of case improves over time. 		<p>components:</p> <ul style="list-style-type: none"> • area • cases • design time • do-It-Yourself (DIY) • expertise • knowledge • knowledge workers • people • process programming • programmer • run time
C1	• Knowledge-driven	The status and availability of data and knowledge objects drive human decision making and directly influence the flow of process actions and events.
C2	Collaboration-oriented	Process creation, management and execution occurs in a collaborative multi-user environment, where human-centered and process-related knowledge is co-created, shared and transferred by and among process participants with different roles.
C3	• Unpredictable	The exact activity, event and knowledge flow depends on situation- and context-specific elements that may not be known a priori, may change during process execution, and may vary over different process cases.
C4	• Emergent	The actual course of actions gradually emerges during process execution and is determined step by step, when more information is available.
C5	○ Goal-oriented	The process evolves through a series of intermediate goals or milestones to be achieved.
C6	Event-driven	Process progression is affected by the occurrence of different kinds of events that influence knowledge workers decision making.
C7	Constraint & rule-driven	Process participants may be influenced by or may have to comply with constraints and rules that drive actions performance and decision making.
C8	○ Non-repeatable	The process instance undertaken to deal with a specific case or situation is hardly repeatable, i.e., different executions of the process vary from one another.

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